

REMARKS

Claims 5-10 are pending. By this Amendment, no claims are cancelled, claim 5 is amended and no new claims are added. Claim 5 has been amended as to form only, and no limiting amendments are intended.

Claims 5, 7, and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,564,641 to Shigyo in view of U.S. Patent Application Publication 2002/0000128 to Williams, and claims 6, 8, and 10 stand rejected under § 103(a) as being unpatentable over Shigyo in view of Williams, and further in view of U.K. Patent Application No. GB 2,107,213A. Applicants respectfully traverse the rejections.

The present disclosure is directed to a method of detection, such as by visual examination, for quantitatively monitoring consequences of an impact at low speed and force on a structural composite material part. The structural composite material part to be monitored is covered in a film that changes color when under pressure and whose color intensity is directly related to a received shock force.

Visual detection methods of the prior art provide a qualitative shock detection in which such detection provides only an indication that pressure of a certain value has been applied to the surface of the examined material with no indication of the magnitude of possible structural problems caused within the underlying layers of the impacted zone. *See, for example,* Specification at page 4, lines 14-15. However, the evaluation method as claimed includes calibration, evaluation and correlation steps that ultimately correlate the color intensity with the received shock force such that a subsequent visual examination of the structural composite material part covered in the calibrated film allows one to correlate *in a quantitative manner* the

shocks or shock energy and the damage evident on the impacted material. *See, for example, id.* at page 9, lines 11-16.

None of the cited references, taken alone or in combination, disclose, suggest, or provide a rationale basis for such an “evaluation method for monitoring consequences of an impact at low speed and force” wherein one calibrates a film by “testing an impact on test parts covered in the film that are identical to a structural composite material part or on test tubes covered in the film, the test tubes being representative of the structural composite material part...” as recited in claim 5, in combination with the other limitations of the claims.

Additionally or alternatively, none of the cited references disclose, suggest, or provide a rationale basis for “evaluating impacted areas of the test parts or test tubes using an appropriate qualification method selected from the group consisting of x-ray or ultrasound to correlate the change in color in the film and a nature and extent of any structural disturbance of subjacent layers of the impacted area” as recited in claim 5, in combination with the other limitations of the claims.

Shigyo is silent generally to a method for monitoring consequences of an impact at low speed and force, and particularly with regards to the calibration and evaluation of the film as claimed. Rather, Shigyo discloses a method for measuring a “large pressure which falls in or exceeds the measurable pressure range of the pressure measuring film...” (Shigyo, Col. 7, lines 39-41) for purposes of developing engines and gaskets, for example. In particular, Shigyo discloses a “method for measuring a pressure applied between opposing first and second surfaces using a pressure measuring film, the first surface being flatter than the second surface, the second surface having a contact portion to contact with the first surface in point contact or linear contact,

comprising steps of: providing the pressure measuring film between said first and second surfaces, the pressure measuring film causing a pressurized portion thereof to develop a color; disposing an elastic sheet between said second surface and said pressure measuring film; applying the pressure between said first and second surfaces while holding said pressure measuring film and said elastic sheet therebetween; detecting a colored image formed on said pressure measuring film to obtain a pressure distribution curve; and determining a maximum pressure applied between said first and second surfaces based on the pressure distribution curve; wherein the pressure applied to said pressure measuring film is decreased as compared with the case in which the elastic sheet is not used.” *Id.* at Col. 2, lines 13-36. Although Shigyo discloses a pressure measuring film generally, there is no evidence anywhere in the disclosure of Shigyo that it contemplates the evaluation method as recited in claim 5.

Williams does not make up for the deficiencies of Shigyo. Williams discloses a method for monitoring a structure for the formation of cracks in which microcapsules in a coating applied to the structure rupture in response to cracking of the structure to release a dye or pigment which changes the color of the coating about the crack. The cracked portions can then be identified by observing color changes in the coating. Williams, Abstract. Williams is cited only for its disclosure of X-ray scanning used for flaw detection in the materials, and like Shigyo, there is no evidence anywhere in the disclosure of Shigyo that it contemplates the method as recited in claim 5.

Patterson does not make up for the deficiencies of either Shigyo or Williams, taken alone or in combination, and is cited only for its teaching of a coating applied to a fiber reinforced

aerospace component to provide a visual indication that the object has sustained an impact which might have caused damage. Patterson, Abstract, and page 1, lines 30-52.

It is respectfully submitted that claim 5 is allowable for at least these reasons. Claims 6-10 depend from claim 5 and are allowable for at least the same reasons claim 5 is allowable.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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